Michigan 4-H Youth Conservation Council

Wetlands Conservation

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Introduction

In December of 2010 the Michigan 4-H Youth Conservation Council debated over which environmental issue held the most importance to our members. Through this process, the future of wetlands in Michigan took precedent.

The focus of the Michigan 4-H Youth Conservation Council is to promote the conservation of Michigan's natural resources and economic development. With the growing emphasis on cost-cutting in the state of Michigan, the Council is concerned with the continued protection of wetlands and their unique ecosystem functions and value. Through our research we strive to identify the benefits and challenges facing wetland mitigation and the current permitting process by reviewing the recommendations of the Wetland Advisory Council Report of October 1, 2010, and other relevant legislation and policies, researching potential funding sources and learning from Michigan businesses, organizations, agencies and citizens.

Functions and Values of Wetlands
Willow Cohn

Michigan's wetland statute of the Natural Resources and Environmental Protection Act defines a wetland as "land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh."[i] Michigan's wetlands are unique and varied ecosystems that serve many valuable functions such as wildlife habitat, groundwater recharge, flood control, shoreline erosion control and water quality protection.

Most of the water in wetlands is ground water and runoff water. Once this water reaches the wetland, bacteria begin to break down the contaminants and the saturated peat stores the water. After the filtering process has cleaned the water, it flows out to rivers and eventually will return back to a wetland. These unique ecosystems are crucial for our Michigan's water quality.[ii]

Wetlands are extremely important to the health and existence of different natural resources of the state, such as inland lakes, fisheries, wildlife, ground water, and the Great Lakes. The wetlands in Michigan provide habitat ideal for breeding, nesting, and feeding grounds. They are used by many forms of wildlife and rare, threatened, or endangered wildlife species. Wetland plants play an integral role in the ecology of the watershed. Wetland plants provide breeding and nursery sites, resting areas for migratory species, and refuge from predators. Decomposed plant matter released into the water is important food for many invertebrates and fish both in the wetland and in associated aquatic systems. These habitats are among the most productive ecosystems in the world. Enormous varieties of species of microbes, plants, insects, amphibians, reptiles, birds, fish, and other wildlife depend in some way on wetlands and without the wetlands would struggle to exist.[iii]

Wetlands play a critical role in regulating the movement of water within watersheds as well as in the global water cycle. The wetlands slowly absorb excess water and release it when necessary into associated surface water resources, ground water, and the atmosphere. The sponge-like quality of wetlands allows them to return water to the ground during dry periods. A wetland with flourishing vegetation intercepts runoff and removes pollutants from the water. Undisturbed wetlands can store up to 60 days of floodwater.[iv] Wetlands also slow down water's momentum as it travels to the ocean or the river, and less momentum means less soil erosion and reduce flooding.

One of the wetlands most important and unique feature is how it protects the subsurface water and helps maintain the valuable watersheds in Michigan as well as cleansing ground water supplies, and naturally flushes out unwanted chemicals in the water. The characteristics of wetlands help provide pollution treatment by serving as a biological and chemical oxidation basin. This in turn, helps save the state of Michigan money by not having to spend money on that pollution treatment. Erosion is controlled due to the wetland serving as a sedimentation area and filtering basin, absorbing silt and organic matter. The plants also reduce erosion as their roots hold the stream bank, shoreline, or coastline.[v] These benefits, often referred to as wetland functions and values, play a vital role in recreation, tourism, and the economy in Michigan.

Threats to Wetlands
Melissa Mikolowski

Just over 150 years ago, there was an estimated 11 million acres of wetlands in Michigan alone. Since the settlement of Europeans, that number has decreased by nearly 75%[vi]. In a percentage of this overall lost, Michigan has lost over 70% of coastal wetlands and the longest natural shoreline along the Detroit River in Southeast Michigan is only 1 mile long.

Under the Wetland Reserve Program, founded by the Natural Resources Conservation Service in 1995, 16,000 acres of wetlands are currently protected. In addition, their future goal is to have restored an additional 5,000 acres of wetlands in Michigan by attempting to build them back where they once were[vii]. In 1997, the Michigan Department of Environmental quality established the long term goal of restoring 500,000 acres of wetlands, though that would only account for 10 % of the historic losses[viii]. Even with all the regulations to protect wetlands, the amount of natural wetlands in Michigan continually declines each year[ix].

Besides natural processes, threats to wetlands are mostly caused by man. Though some have disappeared due to drought, erosion, sedimentation, and flooding, they have been drained and destroyed for the purposes of construction or agriculture. Though the concept was created to protect wetlands, mitigation has only succeeded in recreating wetlands by replacing natural ones. Once a wetland is destroyed, a wetland with the full benefits of a natural wetland is nearly impossible to recreate. Resource extraction, channelization, chemical alterations, and dam construction have also contributed to the extreme decline of wetland function and values.

Anthropogenic sedimentation has been used to fill in wetlands to create ideal ground for either industrial complexes or agricultural purposes. Resource extraction has taken out important resources to wetland health, including plants and watersheds that influence wetlands, and overall has destroyed the benefits of the wetland. Channelization is a modification of rivers and stream where cement walls are added to prevent flooding. This also prevents water from going through the natural wetland filters, has destroyed wetlands by limiting the amount of nutrients plants can gain, and has prohibited the wetlands ability to naturally filter out debris from water. Chemical alterations in wetlands from toxic pollutants cause releases and changes in nutrient levels. Dam construction has not only destroyed wetlands by being built over them, but also by restricting the water flow to a wetland and no longer giving it the potential to act as a "wet" land., though they have also been found to create wetlands by slowing and backing up water.

Wetlands Survey
Brennen Burns

The citizens of Michigan understand that wetlands are a valuable resource in our state. In an online survey by the Michigan 4-H Youth Conservation Council, respondents showed a strong support in protecting the wetlands of Michigan. The survey was published using the website Surveymonkey.com, and a link to the survey was sent out by council members through email. The survey was open form February 12, to February 27 2011.

A total of 237 people completed the 10-question survey, (one free response, and 9 multiple choice). The first questioned asked which county the taker was from. There were 23 from Washtenaw, 22 from Wayne, 18 from Oakland, 14 from Cheboygan, 11 from Ingham and Kent, 9 from Kalamazoo, 6 from Barry and Macomb, 5 from Berrien and Calhoun, 4 from Clinton, Livingston, and St. Claire, 3 from Bay, Emmett, Ionia Jackson, Marquette, Montcalm St. Joseph, Tuscola, and Van Buren, 2 from Alcona, Alpena, Branch, Genesee, Houghton, Isabella, Lapeer, Menominee, Monroe, Osceola, and Shiawassee, 1 from Alger, Allegan, Baraga, Cass, Grand Traverse, Iosco, Keweenaw, Leelanau, Lexington, Mackinac, Muskegon, Newaygo, Ottawa, and Saginaw. 28 people did not report their county correctly.

The second question was the respondent's sex. 66 (28%) were Male while 167 (72%) were Female.

The third question polled the respondent's age. The majority of the respondent's were 55-56 years old with 98 people (42.1%). 90 of the respondents (38.6%) were between 30 and 49. Eighteen of the respondents (7.7%) were above the age of 66 and 4 of the respondents (1.7%) were below the age of 18.

The fourth question asked if the respondent understood the value of wetlands in an environmental standpoint. Four choices were given; little understanding, some understanding, good understanding, and strong understanding. Four people (1.7%) had little understanding. Twenty -three people (9.9%) had some understanding. Eighty-six people (37.1%) had good understanding while 119 people (51.3) had strong understanding of wetlands in an environmental standpoint.

The fifth question asked if the respondent understood the value of wetlands in an economic standpoint. Four choices were given; little understanding, some understanding, good understanding, and strong understanding. Fourteen people (6%) had little understanding. Fifty-five people (23.7%) had some understanding. Eighty-five people (36.6%) had good understanding while 78 people (33.6%) had strong understanding of wetlands in an economic standpoint.

The sixth question asked if the respondent believed wetlands could successfully be artificially created by Mitigation. Four answers were provided again; not at all, sometimes, most of the time, and all the time. Two people (0.9%) thought mitigation was always successful. Forty-four people (19%) believed mitigation is never successful. Twenty people (8.6%) believe mitigation is successful most of the time while the majority of the respondents, 166 people (71.6%) believed mitigation is only sometimes successful.

Next, the survey asked if the respondent would be willing to pay some sort of tax to support the wetlands. The majority of the people 174 of them (75.7%) would be willing to pay some sort of tax, while the 56 others (24.3%) would not pay a tax to help support the wetlands.

The people of Michigan believe wetlands are a key component for water quality. When asked if asked if wetlands were; not important, somewhat important, important, or very

important to water quality, 6 people (2.6%) believed they are not an important part. Eighteen people (7.8%) believed wetlands are somewhat important. Fifty-seven people (24.6%) believed they are important. But the bulk of the respondents, 151 (65.1%) thought that wetlands are very important to water quality.

The respondents were asked if they believe businesses recognize the importance of wetlands, and want to protect or conserve wetlands. From a rating scale of 1 to 5, with 1 being businesses do not recognize the value of wetlands, and do not protect or conserve wetlands, 3 being businesses sometimes recognize the value of wetlands, and sometimes protecting or conserve them, and 5 being businesses always recognize value of wetlands, and always protect or conserve wetlands. Forty-five people (19.6%) chose a 1 rating. Sixty-seven people (29.1%) gave a rating of 2. The majority 112 people (48.7%) gave a rating of 3. Four people (1.7%) gave a 4, while 2 people (0.92%) gave a rating of 5. On average the rating given in this question was a 2.35.

The final question was asking if the respondents thought the Federal Government or the State of Michigan should control the Permits for the Conservation of Michigan Wetlands. An astonishing 208 people (90%) thought Michigan should control the permits, while only 23 (10%) thought the Federal Government should have the control.

The majority of the people believed wetlands are a key component in keeping fresh pure water. When businesses or citizens destroy wetlands, it is hard to replace wetlands. People are willing to help the State of Michigan protect the wetlands of Michigan.

Wetlands Conservation Programs
Mallory Ramelis

In this report it will deal with the concerns of Wetlands Conservation Programs, Conservation Easements, and What Artificial Wetlands Provide. Conservation Programs are very important to Michigan Wetlands, and that we need to protect the remaining natural wetlands.

The Michigan Wetlands Reserve Program (MWRP) began in 1995 with the first piece of 180 acre of land in Jackson County. The focus of WRP in Michigan is to "provide a wide diversity of high quality wetland, and associated upland as habitat for migratory birds and wildlife". They say that their success comes from the wide variety wetland types (marshes, shrub-scrub, and wet prairies). So far Michigan has over 125 easements and 16,000 acres of land in the WRP. They have thousand of wetlands protected on a 30-year program and permanent easements.

The Michigan Department of Environment Quality (MDEQ) has come up with a strategy to help with restoring Michigan Wetlands. Michigan Wetland Conservation Strategy provided a short term goal of producing 50,000 acres of wetlands by 2010, while the long term goal was to have 500,000 acres of wetlands restored. It is all voluntarily done and they have created a group called the Michigan Wetland Working Group (MWWG) it is a state, federal, and non-governmental group that wants to increase the wetland restoration programs and uses the available resources to restore wetlands in Michigan. The MDEQ also has a goal which states that they would like to minimize the delays that organizations have when restoring wetlands. [x]They also deal with Conservation Easements.

Conservation easements are voluntarily made agreements and allow the landowner to still own the land, and can transfer different rights only with the use of the land, and can only be done by a qualified nonprofit organization, governmental body, or other legal groups or persons.

Under Part 21 of the Michigan Naturals Resources and Environmental Code (Act 451 of 1994) states that "The creation of voluntary conservation easements. A conservation easement under this statute can provide limitation on the use of, or can prohibit certain acts on, a parcel of land. The easement is considered a conveyance of real property and must be recorded with the registrar of deeds in the appropriate county to be enforceable against a subsequent purchaser of the property."

Conservation Easements are very easy to use. The public is not allowed on the wetland. The only way that the public can be on the land is if the landowner of the easement grants it. The Easement can be changed before legally recorded to meet the needs and wants of the landowner. They can be used to protect the wetland from disturbances. [xi]Many of Michigan's natural Wetlands aren't all protected by easements, but artificial wetlands are being protected by easements.

The MDEQ had stated that "artificial wetland program is, in fact, a mess." Artificial Wetlands are efficient for improving the quality of storm water and many of the wetlands are being made in landfills.[xii]

The recommendation, as a result of this report, would be that the current policy on conservation easements needs to be clearly stated as to what the landowner can and cannot do on the land. This would allow for preservation of the natural wetland and would it eliminate unnecessary artificial wetlands. Artificial wetlands do not provide the natural habitats that the wildlife is accustomed to.

Wetland Mitigation Rules and Results
Kara Hodges

The balance between economic development and environmental protection is delicate. Business is important because it offers jobs, profits, and technology to Michigan residents, giving them a better quality of life. On the flip side, environmental protection preserves the striking beauty and integrity of Michigan's unique natural resources for future generations. In times when economic strength is lacking it is important to find ways for it to grow without sacrificing the health of the environment. One way the state has tried to offset the harm of development is through wetland permitting and mitigation.

Wetland mitigation is defined as "the replacement of unavoidably lost wetland resources with created or restored wetlands, with the goal of replacing as fully as possible the functions and public benefits of the lost wetland"[xiii]. Under Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, the Michigan Department of Environmental Quality has the power to require individuals or companies building on wetlands to mitigate the damage, providing certain conditions. These conditions are as follows: the wetland impacts are otherwise permitable under sections 30302 and 30311 of the act, no feasible and prudent alternative to avoid wetland impacts exist, and the applicant has used all practical means to minimize impacts to wetlands. If the wetland impact is less than 1/3 of an acre, the purpose of the activity is to create or restore wetlands, the activity is authorized under a general permit, or no reasonable opportunity for mitigation exists, the MDEQ may choose to waive the mitigation condition. The MDEQ may also accept credits from a mitigation bank as an alternative to wetland mitigation.

Once mitigation has been decided on, the amount of mitigation, the method, and the future preservation of the mitigated wetland must be decided upon. The overall goal of

mitigation is no net loss of wetlands. With that in mind, the MDEQ has several conditions for wetland mitigation. First, the created wetland must be of similar ecological type as the wetland being destroyed, if possible. Secondly, different types of wetland require different amounts of mitigation. For every 1 acre of state-based rare wetland impacted, the permittee is required to create 5 acres of replacement wetland. For every acre of forested, coastal, or inland lake wetland not classified as rare, the permittee must create 2 acres of mitigated wetland. Finally, 1.5 acres are required for the mitigation of 1 acre of every other type of wetland. Should the mitigation be in the form of the preservation of existing wetland, every 1 acre impacted must result in 10 acres of mitigation. The MDEQ may increase or decrease the amount of mitigation by up to 20 percent depending on the ecological type of the wetland impacted. It may also double the required amount for after-the-fact permits.

Wetland mitigation is not an easy thing to accomplish. Creating a wetland habitat where one has not previously existed is both costly and extremely difficult[xiv]. It typically involves the alteration or installation of water ways, careful soil layering, and the cultivation of multiple plant species[xv]. Due to the severe time and cost commitment, the restoration of previously existing wetland is usually preferred. Restoring previous wetlands drained for activities such as agriculture can be accomplished by breaking drain tiles and filling in the drainage ditches (Todd). Before beginning a wetland mitigation project the permitee must create a conceptual mitigation plan submitted to the MDEQ. This plan must include: a wetland data form summarizing the wetland information and how mitigation will compensate for its loss, the location of the proposed wetland site in relation to surrounding landmarks such as roads, the acreage and type of wetland created or restored, baseline conditions of the proposed wetland mitigation site, a description of how the wetland will be created or restored[xvi]. Once finished, the permittee is required to protect the mitigated area by way of a permanent conservation easement[xvii]. Detailed site monitoring reports must be completed by applicants and submitted to the MDEQ annually to access whether the mitigation site is meeting the ecological standards outlined by the state. All in all, wetland mitigation requires an enormous amount of resources, even after completion.

With all these strict regulations, one must ask how successful wetland mitigation is. Unfortunately, the data is less than promising. A 2001 MDEQ review of mitigation sites in Michigan showed only 29% of permits implemented the required amount of mitigation[xviii]. The same study found that only 22% of sites compared to reference wetlands were ecologically successful. A 2003 study by Michigan Technological University students found similar results. The students examined 59 permits in a ten-county area of the western Upper Peninsula to examine how Michigan's wetland mitigation program compared to the national program controlled by the United States Army Corps of Engineers. Of private and non-government permittees, only 85 percent had completed some form of the required mitigation and only 41 percent had submitted the required reports to the MDEQ. Overall 40 percent of permittees had violated one or more permit requirements. Only 67 percent of road commission permittees had completed wetland mitigation sites and only 13 percent had submitted the required monitoring reports. Overall 56 percent had violated one or more permit requirements. Yet another study 37 sites constructed between 2003 and 2006 in the Upper Penninsula found serious problems with wetland mitigation. Only 30 percent of county road commissions and 47 percent of all other permittees were in compliance with monitoring report requirements. Fifty-one percent of sites had been placed into required conservation easements and only 45 percent met MDEQ invasive

species standards. These studies are not unique. Similar results have been reached by other researchers on both a state and national basis.

Not all the results of the studies were negative. All the above cited studies concede that when it comes to quantity, there was no net loss. In the case of the 2003 to 2006 study, 71.2 acres of wetland were destroyed, but over twice that amount, 185.5 acres, were created. Both this study and the Michigan Tech study found that one group in particular, the Michigan Department of Transportation, had outstanding compliance rates with 90 percent or above. Studies also show that wetlands created adjacent to natural wetlands or from drained wetlands have much higher success rates. According to Todd Lossee of the DEQ, "... we have gotten a lot better with creating wetlands, but it requires significant effort and cost."

In light of all this information, the question is how Michigan can improve upon the success of the wetland mitigation program. The most common suggestion is increased monitoring of mitigation progress and both quick and strict enforcement of infractions. To accomplish this, however, Michigan would need to increase the monitoring staff and be willing to go after infringements in court. While this could cause and initial increase in spending, it would also generate jobs and be one of the best things the state can do to truly protect wetlands. Another recommendation would be to limit mitigation site selection to locations with better success rates, such as adjacent or historical wetlands. Finally, the ecological standards of mitigated wetlands need to be better defined and include criteria such as community structure, soil, hydrology, amphibian communities, and vegetation. If these suggestions are implemented perhaps Michigan's goal of no net loss can met in the area of quality, not just quantity.

Wetland Banking
Meggie Spens

Wetlands now are being destroyed for man's use. People fill them and build other important buildings on them. Mitigation sounds like a good thing to do when we decide to use wetland property as a construction site. Not many people know that mitigation does not work half of the time. Therefore, the following discussion is about wetland banking, short, and long-term goals for wetland mitigation.

Therefore, let us start out with wetland banking. Wetland banking is the tracking of wetland credits that may be used for replacing wetland losses in the future. Wetland banking can benefit many things connecting to mitigation. First, mitigation banking helps the state's wetland resources by increasing improvements with making new wetlands instead losses. Second, it improves the bringing together of smaller mitigation projects into bigger, better planned and thought out ideas for wetlands. Third, it encourages the increasing of wetland mitigation projects that connects with resources of watersheds. Finally, mitigation banking also benefits a wetland permit applicant. For example, by cutting down the costs, time, and putting a limit on having to mitigate wetlands. [xix]

Besides that, there is a process for developing mitigation banks in Michigan. First, the sponsor will have to contact the MDEQ to discuss the banking, the site of the banking, the site planning, and then submit a pre-proposal to the MDEQ. Then, the MDEQ looks over the pre-proposal and checks out everything that is required on the forms. After the MDEQ reports back, the sponsor starts working on the design and drafts a new mitigation banking agreement proposal. Next, the sponsor gives the MDEQ the proposal, then waits for the outcome on the review of the proposal. Afterwards, the MDEQ gives feedback to the sponsor, and then the

proposal has to be agreed upon by both parties and signed by both the sponsor and the MDEQ. Pursuing this further, the sponsor gets all permits, constructs and monitors the bank, and sends the paperwork to the MDEQ. Then, the site of the conditions to ensure that the wetland bank is actually working before giving banking credits. Lastly, the sponsor tells the MDEQ about the credit transactions and makes a long-term management plan. [xx]

Next, let us talk about long-term and short-term goals of mitigation. The State of Michigan Wetland Conservation Plan has many goals for the No Net Loss/Net Gain Goal. Short-term goal is to have restoration of fifty thousand acres of wetlands by 2010 has passed but it was not enforced. In addition, a long-term goal would be with no certain amount of time to have the restoration of five-hundred thousand acres. The tracking of wetland gains by restoration programs was scarce in the past years following completion of the Conservation Plan. However, recent records say that only a estimated 19,100 acres of wetland have been restored in Michigan from 2000-2004, reported from the many voluntary state, federal and private partnership programs. Finally, the rules for the Wetland Protection part of the Natural Resources and Environmental Protection Act says that, "An applicant shall provide mitigation to assure that, upon completion, there will be no new loss of wetlands." [xxi]

The achieving of the goal "no overall net loss" of wetland acreage and functions has an impact on the Section 404 of the CWA (Clean Water Act). About 47,000 acres of wetland mitigation are under the 404 Clean Water Act to reimburse 21,000 wetland losses and the gain of 26,000. Meanwhile, to meet the goal of the "no net loss" the government would have to replace the wetlands better than what they were before. Many reports say that most of the wetland mitigation projects are not successful because of the lack of permit conditions. Therefore, out of seven studies looking to find the percentage of wetland mitigation projects, only four were successful. The long-term goal that needs the most improvement is maintenance. Vegetation was the most improved. Studies have also shown that 70 to 76 percent of wetland mitigation sites are made into wetlands nationally, but in Michigan 29 percent of wetland mitigation sites are fully completed. [xxii]

Furthermore, the 404 Clean Water Act is not successful because of losing more wetlands than saving them. Different types of wetlands are getting scarce because they are not being protected. More studies say that 17 percent of wetland mitigations that were made lost functions but others say that 29 percent of wetland missions have lost functions. In the meanwhile, many mitigation projects do not include wildlife criteria and the protection of wildlife habitat. Only 41 percent replaces wildlife habitat and protection. Finally, Michigan's government developers and other permittees do make some of the goals but does not make most of them. Therefore, fixing those problems can make the world a better place for animals and people to live. [xxiii]

Wetlands are very important pieces of land that give us more than we think. If people fix and solve the problems with mitigation and wetland loss, we can save lots more wetlands. Regular people would recommend that the state of Michigan be more careful when they work with mitigation and how they control wetlands. The state should make goals that benefit wetland conservation, and reinforce rules and laws that will make them work. If everyone works together towards meeting these goals, then the growth of wetlands can increase.

Wetlands Animals
Dakota Hewlett

Michigan's wetlands are now in need of repair because of the human destruction of these precious assets caused in previous years. Michigan's wetlands were once under the total control of nature. As human progression moved into Michigan the wetlands were greatly impacted. Over time through ecological succession, open water may be eliminated, replaced with a continuous bog or wet meadow. Floodplain swamps could decrease or increase with the regular changes in a river's channel. In the long run, such natural change is inevitable. Wetlands in Michigan have been growing, shrinking and re generating according to natural cycles since the last Ice Age and can still be observed today.

Since the early 1900s, wetland loss has multiplied due to filling and drainage by the human succession. In natural progression, wetlands can fluctuate and be created or lost, but after they are destroyed they are very difficult to replace. Prior to World War II, agricultural drainage was the reason for most of the destruction. More currently, a great deal of wetland eradication has been brought forth by commercial, industrial, and residential distension. It is estimated that the 11 million acres of Michigan wetlands that existed in the pre-European-settlement era have now been diminished to an unsubstantial 3 million (estimated) acres.[xxiv]

Due to the great diversity of Michigan's wetlands, bogs, fens, marshes, ect, there is a vast distinction of various species. Encompassed in wetland habitats are aquatic, amphibian, reptile, mammal, fungal and microorganism species. Most of the native species are great benefactors to the ecosystem, but the increasing populations of invasive species in Michigan have also altered our wetlands. Likewise, the actions of humans cause the negative effects of pollution, filling in of wetlands, agricultural drainage and assorted chemicals dispensed. Included in populations inhabiting our wetlands are threatened and endangered species.
Examples of Animals and plants found in Michigan's wetlands:

Bowfin	Brook Stickleback	Bulrush
Cardinal-Flower	Common Cattail	Common Loon
Cotton Grass	Damselfly	Dragonflies
Dragon's Mouth, Wild Pink	Dwarf Mistletoe	Eastern Newt
Great Blue Heron	Green Frog	Green-backed Heron
Iris	Kingfisher	Kirtland's Snake
Lichen	Liverwort	Marsh Wren
Marsh-Marigold	Michigan Holly	Minnow
Northern Harrier	Osprey	Pitcher Plant
Poison Sumac	Red Maple	Red-bellied Dace
Red-winged Blackbird	Sandhill Crane	Smartweed, Knotweed
Snail	Sphagum Moss	Spotted Turtle
Sundew	Tamarack	Trumpeter Swan
Water Milfoil	Water Shrew	Water-lily
Waterweed, Elodea	Egret	

Threatened and endangered species:

Northern leopard frog	Blanding's turtle	Spotted Gar
Marbled salamander	Eastern Box Turtle	Redside Dace
Blanchard's cricket frog	Trumpeter Swan	Sauger
Spotted turtle	Common Loon	Blue Pike
Kirtland's snake	Bald Eagle	

This list was produced by the Endangered Species Program of the Michigan Department of Natural Resources and the Michigan Natural Features Inventory.[xxv]

"Species accounts are available for a number of plant species that have been noted as invasive or having invasive tendencies in Michigan. Some of these are commonly recognized invasive species such as Garlic Mustard, Purple Loosestrife or Phragmites (Giant Reed). Others are emerging threats in Michigan such as Black Jetbead, Swallow-wort, Water Hyacinth or European Frog-bit. A few, such as Hydrilla and Mile-a-Minute, are not yet in the state but are nearby and considered particularly destructive. Early detection and eradication of these species is critical in preventing further damage to Michigan's natural areas."[xxvi]

Invasive Species in Michigan's Wetlands:

Black Alder	Yellow Sweet Clover
Russian Olive	Phragmites
Norway Maple	Water-hyacinth
Black Locust	Eurasian Water Milfoil
Autumn Olive	Flowering Rush
Morrow's Honeysuckle	Purple Loosestrife
Japanese Honeysuckle	Water Lettuce
Garlic Mustard	Water Chestnut
Canada Thistle	Narrow-leaved Cattail

Invasive species can be devastating to Michigan wetlands. They can push out native populations, obliterate the local food source, kill our native species and even be harmful to humans.

The importance of Michigan's wetlands is too great to let them be passed by again. With their functions for water quality and flood control they are necessary to our environment. The wildlife species that rely on our wetlands and that are the livelihood of Michigan as well as the hard working people that keep our State running. These species should be considered along with the negative of invasive species effects in the event of any new legislation regarding our wetlands.

Economic Value of Wetlands
Duncan MacLeod

Michigan wetlands have significant economic value as well as providing an important habitat. Wetlands are some of the most biologically productive habitats on the planet, and play a crucial role in the life cycle of as much as 90% of all fish caught recreationally[xxvii]. While it can be difficult to put a monetary value on the functions a natural feature like a wetland plays, there are other values that can be quantified. These can include everything from economic revenue from hunting and fishing to water filtration and flood prevention.

Michigan wetlands provide some of the best hunting and fishing in the state. Wetlands produce more plants and animals per acre than any other Michigan habitat[xxviii] Michigan ranks third in the country in licensed hunters (750,000) who contribute $1 billion to the economy annually[xxix]. We also rank among the top states in registered boats and anglers (with 1.5 million), who contribute $2 billion to the state economy annually. Our wetlands are home to or utilized by more than 40 percent of the 575 vertebrate wildlife species in Michigan. This includes 10 to 15 of the 66 mammals, 180 of the 370 birds, 22 of the 28 reptiles, and all of our amphibians. Coastal wetlands in particular provide an important shelter for many fish including many commercially caught species throughout their life cycle[xxx]. They have also long been known to be a critical habitat for waterfowl, including many popular game birds such as ducks and geese, and shorebirds for nesting, migration, and feeding.

One of the most important, but least mentioned economic values of wetlands is the value of the functions they perform. There have been many studies recently on just how valuable the services that natural features like wetlands provide based on how expensive it would be to replace the functions. Economists estimate that one acre of wetlands provides about $10,000[xxxi] worth of ecosystem services per acre. These include filtering and recharging drinking water, flood prevention, protecting our coasts from storms, as well as providing habitat for wildlife. The primary reason that they do these so well is that they can absorb and store a large quantity of water and release it very slowly. All of these are things that our wetlands do for free which would be very difficult or expensive to do artificially.

For better or for worse, human activities have a large effect on wetlands in Michigan and around the country. Human activities have been responsible for the loss of nearly half of Michigan's wetlands since colonial times[xxxii]. This has been historically primarily been conversion of land for agricultural uses, although urban and commercial development have been a significant issue more recently. Although wetlands can filter most natural contaminants, there are some industrial or man-made compounds that can severely impact them. One such example is oil spills like the one on the Kalamazoo River last July.

We also have the potential to impact our wetlands in positive ways. One of these is through the breeding and reintroduction of fish species that were lost due to overfishing and other causes back into our lakes and rivers.

Which Wetlands are Protected?
Joe Dietsch

Protected wetlands in Michigan include, wetlands connected to, or within 1,000 feet of a Great Lake or Lake St.Clair, or are connected to, are within 500 feet of any inland lake, pond, river, or stream. If a wetland is more than five acres in size, it is also protected.

Although Michigan does not regulate all wetlands, some municipalities have adopted more rigid regulation regarding wetland preservation. Some of the municipalities which have done so are listed below:

Clyde Township, Allegan Co.
Forest Home Township, Antrim Co.
Argentine Township, Genesee Co.
Fenton Township, Genesee Co.
Caseville Township/Village, Huron Co.
Meridian, Charter Township of, Ingham Co.
Williamstown, Township of, Ingham Co.
Elba Township, Lapeer Co.
Empire, Village of, Leelanau Co.
Brighton Township, Livingston Co,
Pinckney, Village of, Livingston Co.
LaSalle Township, Monroe Co.
Addison Township, Oakland Co.
Auburn Hills, City of, Oakland Co.
Bloomfield Township, Oakland Co.
Franklin, Village of, Oakland Co.
Independence, Charter Township of, Oakland Co.
Milford, Charter Township of, Oakland Co.
Novi, City of, Oakland Co.
Oakland, Charter Township of, Oakland Co.
Orchard Lake Village, Oakland Co.
Orion, Charter Township of, Oakland Co.
Oxford, Charter Township of, Oakland Co.
Rochester Hills, City of, Oakland Co.
Southfield, City of, Oakland Co.
Waterford, Charter Township of, Oakland Co.
West Bloomfield, Chtr. Township of, Oakland Co.
White Lake Township, Oakland Co.
Wixom, City of, Oakland Co.
Fabius, Township of, St. Joseph Co.
Ann Arbor, City of, Washtenaw Co.
Ann Arbor, Charter Township of, Washtenaw Co.

Pittsfield Charter Township, Washtenaw Co.
Salem Township, Washtenaw Co.
Superior, Charter Township of, Washtenaw

This list is from Glen Pape, MSU Extension Land Use Educator.

Two specific ordinances are from Williamstown Township, which is in Ingham County, and Grattan Township, in Kent County. Williamstown Township has an ordinance to protect wetlands as small as two acres[xxxiii]. In contrast to the State of Michigan regulation which only protects wetlands larger than five acres. Grattan Township has two separate wetland protection ordinances, one protects wetlands two acres or larger and the second outlines regulations for wetland smaller than two acres[xxxiv]. In the regulations protecting wetlands smaller than two acres the township takes several factors into consideration.

- Whether the site supports and maintains an environment for endangered or threatened, plants, fish, birds, or wildlife.
- If the area has unique or rare ecosystem.
- The site provides groundwater recharging, pollution treatment, and/or flood control

Protecting wetlands smaller than 5 acres should be considered, because small wetlands can play an important role in nature's ecosystem. State and local regulations for protecting wetlands should be revisited to protect smaller areas of wetland environments.

Wetlands Program Funding and the Michigan Senate Bill 168
Samuel Owens

A definite problem in concern with wetlands would be the funding of its programs and protection. In order to provide quality support for Michigan's wetlands then we must find alternative sources of revenue to dedicate to these programs.

1979 through 2009 wetlands programs were funded through general funding sources. In order for general funding to pick up once more the overall importance of this program will have to be reviewed. $1.5 million of the funding is from the permits and another $400,000 is from program development grants. Governor Granholm, Representative Warren and Senator Birkholtz supported a bill to fund Michigan's wetlands programs through 2012 using unclaimed bottle deposits. This action has provided about $2.1 million a year to the program, this funding source will end 2012[xxxv]. The purpose of the environmental protection fund was to give the wetland advisory council time to form and find alternative funding sources for the wetland programs. Without proper funding, the program would need to be returned to the federal government (EPA Army Corp of Engineers). The current options for wetlands programs funding is limited, two possible sources are the general funds or raising the cost of permitting fees.

Though Michigan is in definite need of funding and switching to federal control would save Michigan some money, I strongly recommend keeping the regulation of Michigan's wetlands under state control as well as demonstrating the importance of these programs. Our wetlands are too valuable and vulnerable to lower the protection on them.

The Senate Bill 168 is to allow the road commissions to work on some road projects without going through the permitting process; was referred to the committee on Natural Resources, Environment and the Great Lakes 2-17-2011. This bill will save the road commissions money on land acquirements and labor costs. On the contrary Michigan will lose many wetlands without any being made in return without public input. In the even that this bill

would pass the federal government may feel inclined to intervene for it requires wetland mitigation, and the bill does not include road projects funded with federal money. Also, this bill may threaten Michigan's independent permitting system if the federal government says it goes against the federal laws. The bill has not yet been passed by the Senate. Although, the bill does increase cost efficiency of road projects along with reducing the time involved with getting started.

The council would recommend consideration of site evaluations prior to road work in order to determine rare species and wetland quality as well as a requirement of reptile crossings as an alternate use of the funding which would have been used on the permits. The cost reduction would be highly appreciated yet the council is worried that it may lead to a net loss of wetlands within the state.

Wetlands Protection: Constitutional Violation

Suzie Smith

As long as there has been landowners and government there has been debates on who owns what property, who can build on it, and what can the Government do to take a person's land away from them. People get in the mind set that once they buy a piece of property, it is theirs and they can do what ever they want on that piece of land. In all truth, then can – to a certain extent.

The Government can buy land from the owner for various reasons including building a highway and protecting an endangered species. This is called Eminent Domain (1). Eminent Domain is described as the Government taking land from the owner and then justly compensates that person, no less than 125% of the property's fair market value. This is to ensure that the government is not just taking advantage of its power.

Violations of various laws happen all the time. The Government does a good job when deciphering whether or not the action under investigation is a legitimate violation. A man named John Rapanos wished to fill three areas on his property to build a shopping mall. The Michigan Department for Environmental Quality was very insistent that he not fill in the areas because they were protected wetlands under the Clean Water Act. There were disputes and rebuttals the translation of the law, where his property was located and many other things. The case finally ended with John Rapanos' argument rejected and the law upheld.

The base of the Clean Water Act was enacted in 1948, but was restructured in 1972. They finally changed the name from the Federal Water Pollution Control Act to the Clean Water Act in 1977. The purpose of the CWA was to help with the preservation of the water and the wetlands in the United States. The Government needed a way to protect the water and wetlands from pollution by big companies and by the people. The Clean Water Act was created to establish basic regulation parameters for the discharge of pollution into the wetlands as well as the larger bodies of water throughout the nation.

Justices have argued back and forth trying to decide what constitutes a violation of the Clean Water Act for a long time. Many cases have resulted in a split ruling. The judges do not always agree on what is considered pollution, what is a violation and what is a legitimate concern. Most of them do agree, however, on the fact that there are many ways to pollute, and they should all be considered when looking at the protection of the wetlands and waterways in the nation via the Clean Water Act (4).

There is a lot of complexities in the Governmental system about who owns what land, who can build on it, and what rights the people have that the Government can and cannot take away. Through proper legislation, and proper enforcement, these areas of concern can be cleared up. People have argued for many years on what is and what is not a violation of a law and people will keep trying to get around the rules and guidelines and find loopholes in many situations.

National Wetlands Protection
Zachary Childs

At one time the United States was blessed with 225 million acres of wetland. [xxxvi] Exotic birds and animals made wetlands their home. Early settlers relied on resources including fish, game, natural crops and agriculture on the floodplains. During 1849-1860 Congress enacts some of the first water acts called the Swamp Land Acts that granted 15 states 65 million acres in order to encourage them to "reclaim the lands for flood control and drainage".

It wasn't until 1967 the Fish and Wildlife Coordination Act was developed that required the U.S. Army Corps of Engineers to include the ecological effects in their regulations. [xxxvii] This still did not stop development from destroying wetlands and the water many species including ourselves use to survive. In 1972 the Federal Water Pollution Control Act Amendments of 1972, known as the Clean Water Act, was implemented. Under section 404 allows authorities (U.S. Army Corps and the EPA) to issue permits to discharge dredge and fill material into waters of the United States and to review and veto *Corps actions and policies.* In other words, they needed a permit to destroy the wetlands. Section 404 was clarified in August 1993 as a result of the lawsuit North Carolina Wildlife Federation et al vs. Tulloch.[xxxviii] The outcome revised the definition of "discharge of dredge material" to include, "any addition, including redeposit, of dredges material, including excavated material, into waters of the United States which is incidental to any activity, including mechanized land clearing, ditching, channelization, or other excavation. This change will also help to narrow the exemption for the drainage of wetlands, since most draining involves *some degree of dredging.*

Most wetland conservation is regulated by each individual state. In 1963 Massachusetts became the first state to adopt a *wetland protection statute.* During the years 1968-1975 most coastal states adopted costal wetland regulation statues or included wetland protection as a part of broader *costal zoning statutes.* An estimated 3,000-4,000 local governments have also adopted w*etland protection ordinances.*

The most notable feature of federal wetland protection policy today is that there is no specific, comprehensive NATIONAL wetland law. Rather federal statutes regulation or otherwise protecting wetlands have evolved piecemeal over the years, and often utilize laws originally intended for other purposes.[xxxix] As a result, jurisdiction for wetland protection is spread over several agencies and federal wetland protection is not as effective as cohesive as it could be.

An Overview of Wetland Permits Across the Country
Abbie Harris

Wetland areas in the United States are important, precious and necessary; therefore they need to be protected. All levels of government – national, state and local – have some responsibility over the activity in wetlands. At the federal level, regulations, such as Section 404 of the Clean Water Act, protect wetlands. At the state level, wetland protection is based on Part 303, Wetlands Protection, of NREPA. Michigan, as well as most Great Lakes states, has passed laws to limit land use in wetland areas and to prohibit certain activities. Working with state governments, county and local governments may have also chosen to set regulations about how wetlands can be used. Partnerships have been formed recently to protect entire wetland areas and watershed. These partnerships include federal, state, tribal and local governments, as well as private land-owners and nonprofit organizations. The WAC was established to review the wetlands program, (permitting, enforcement, and restoration) not to only protect wetlands.

In 2009, an amendment to the Wetlands Protection portion of the Natural Resources and Environmental Protection Act of 1994, created The Wetland Advisory Council[xl]. The council's purpose is to research and analyze programs that impact Michigan wetland and to make recommendations to improve the state's wetland programs to the Governor, the legislature, and the Department of Natural Resources. Members of the Wetland Advisory Council represent many organization, industries, and departments that have a stake in the continued management and protection of Michigan wetlands, including realtors, farmers, conservation groups, the Department of Natural Resources, educators, businesses and manufacturing facilities, citizen groups, and the United States Army Corp of Engineers, among others.

Wetland Use Permits are issued through the Michigan Department of Environmental Quality, not through the Wetland Advisory Council, although the Council may provide input on the permit application process and approval procedure.

The overall goal of state wetland laws and permitting is to protect wetlands. Most states have various laws designed to protect wetlands and limit use there, but some states have stricter regulations and monitoring than others[xli]. Twenty-eight states, including the Great Lakes states, control activities in coastal wetlands and twenty-four states have some kinds of restrictions on inland waterways and wetlands. Generally speaking, these laws and rules are stronger along the navigable lakes and rivers (and their surrounding wetlands) used for shipping. They are also typically stronger in the Northeast, Midwest and Pacific coast. The coastal states also maintain some degree of control over federal permits issued in coastal wetland areas, as part of Section 401 of the Water Pollution Control Amendment and Coastal Consistency part of the Coastal Zone Management Act.

Freshwater and inland wetlands are handled differently from state to state. There are sixteen states, including Michigan, that either monitor and control activities in freshwater wetlands themselves, or have set standards for local governments to follow. Michigan, as well as Minnesota, Indiana, Wisconsin, and three other states have created model wetland protection plans for local governments to follow. Every state, except for New Jersey and Virginia, work cooperatively with local governments to set these standards and regulations. In these states, control of wetland regulations stays at the state level, but Michigan encourages local government to also participate in controlling and maintaining wetlands.

Michigan and New Jersey are the only states so far that are Section 404 of the Clean Water Act "assumed", which means the state issues wetland use permits rather than the U.S.

Army Corps of Engineers but the states are still watched over by the U.S. Environmental Protection Agency[xlii]. Michigan and New Jersey qualify to be Section 404 "assumed" because they have passed adequately inclusive wetland regulations that surpassed federal standards.

Michigan lawmakers and citizens have long recognized the unique geographical situation the state is in, centrally located amid the largest expanse of freshwater on the planet. The Great Lakes are both a blessing and a responsibility and Michiganders are charged with protecting these and all its important wetland areas.

Wetland Permits
Matt Paxhia

Wetland permits are required in many states to help save the dwindling wetlands in each state. Many different animals and plants have their home in wetlands and need this special environment to survive. In taking environment away from animals, an increase in the number of endangered or extinct species in Michigan will occur over time. Permits help restrict Michigan's wetland development and save the habitat from being destroyed. In applying for a permit the fees allow the state to fund staff to protect the wetlands.

Many people don't know that they have a wetland in their back yard at this moment. A wetland is an area that has soils that are not entirely wet or dry and consist of marshes, swamps, and bogs. Many different species of animals live there and need that ecosystem to survive. Requiring permits to protect certain wetland types help protect the environment. The permit restricts development of certain wetlands thereby maintaining the special ecosystems for the wildlife.

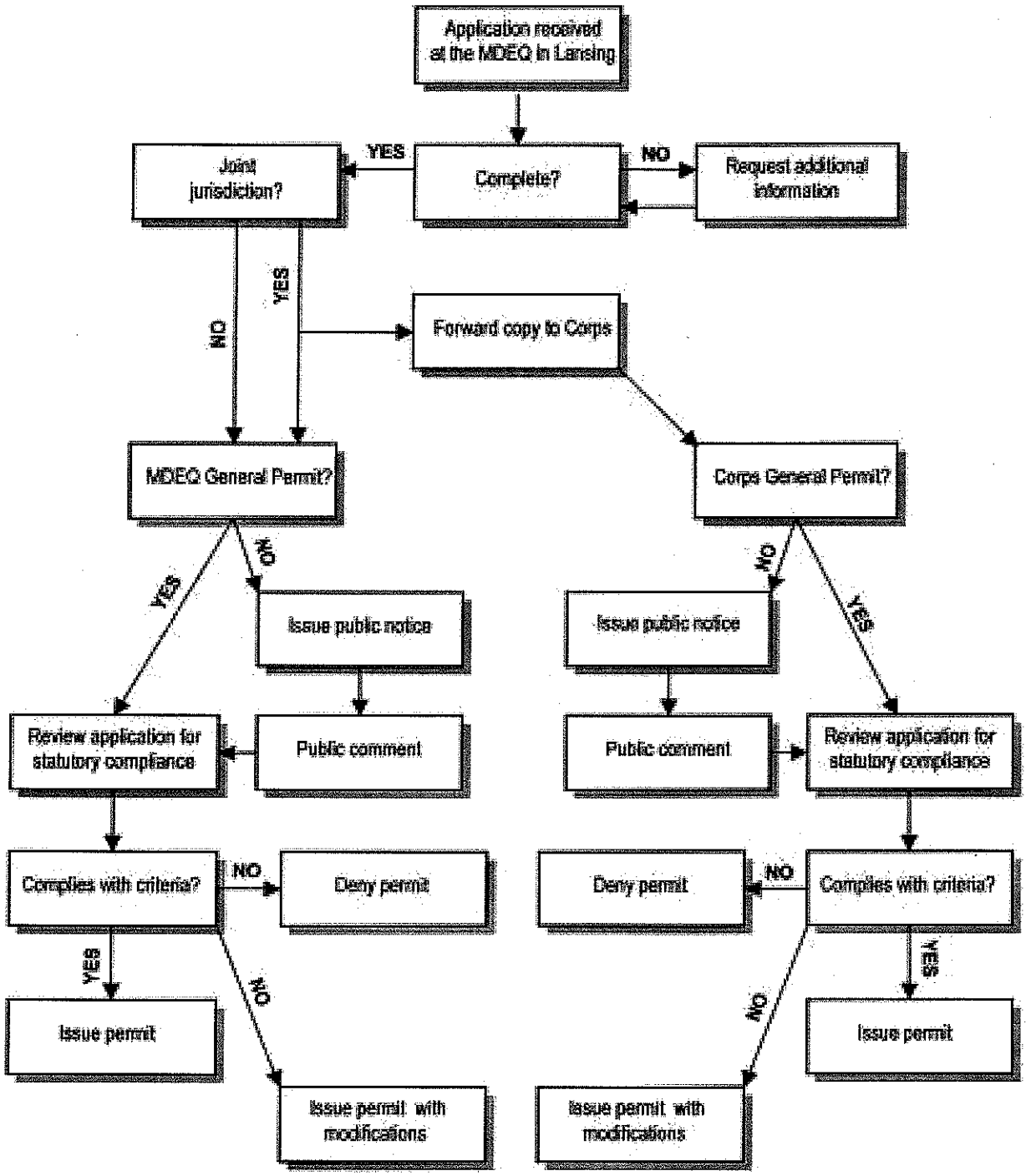
"Under Michigan's Wetland Protection Act, a permit is required for the following activities: Deposit or permit the placing of fill material in a wetland; Dredge, remove, or permit removal of soil or minerals from a wetland Construct, operate, or maintain any use of development in a wetland; or Drain surface water from a wetland." [xliii]. Under these conditions Michigan requires a permit for wetlands. Placing material in a wetland destroys the environment that many native species of animals and plants use as their habitat. This is why permits are required in the state of Michigan, because the permit process helps people manage their land.

The definition of a wetland is stated in the Wetlands Protection Act, "land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh." [i]. In the Wetlands Protection Act it outlines what wetlands are regulated or protected under state law, "jurisdiction over wetlands depends on whether a wetland is contiguous to a water body. Contiguous wetlands are those found in close proximity to a lake, stream, pond, Great Lake, etc., and have a direct hydrological relationship with it. According to the administrative rules promulgated for the Act, wetlands within 500 feet of an inland lake, stream, or pond and within 1,000 feet of a great lake generally are considered contiguous. Noncontiguous wetlands are isolated from lakes and streams hydrologically and, generally, geographically." [i]. Narrowing the types of wetlands that are accepted in the Wetland Protection Act will help save Michigan's wetlands, and Michigan could allow the use of the land for its economy and for protected environments. Defining the type of wetland that will support commercial development and restricting development of other wetlands would allow the protection of more wetlands in the future.

To see the latest list of proposed development projects on a wetland, send a check to the Michigan Department of Environmental Quality (MDEQ). This list would be useful for wetland advocates. "For a $25.00 annual fee, anyone may receive by mail a weekly listing of all permit applications the MDEQ receives." [ii] The check needs to be written for the MDEQ so they can send the list.

An example of how to get a permit is on the next page (Diagram 1 [ii]). The diagram shows how a permit will be granted to an individual who is planning to dredge and fill in a wetland. Follow the diagram to learn how the permit process works.

Diagram 1: Example of permit process "Dredge and Fill Permit and Review Process" [xliv]



Unregulated Wetlands, What A Permit Is, And Why It's Important
Nate Garrett

Wetlands play a very important part in our everyday lives and in the environment; whether it is by purifying and replenishing our ground water supply, or by providing habitat to numerous plants, animals, and insects, or by storing flood water and reducing erosion. Since wetlands play such a very important role they need to be protected because once they are gone they are very hard to get back. That is why wetland permits are so important. They allow officials to go over all of the plans proposed for a wetland and determine the impact those plans would have on the environment. Unfortunately, there are a small percentage of wetlands that are unregulated. This allows developers to do, for the most part, what they want with the unregulated wetland .Though most wetlands are regulated and require a permit and review by the state, there are still unregulated wetlands that are not being monitored.

The Michigan Department of Environmental Quality (DEQ) website provides applications for Wetland Permits that can be downloaded for projects in lakes, streams, or wetlands. It is a joint permit for both the DEQ and the Army Core of Engineers. Applications must be completed and sent to the DEQ in Lansing, who in turn sends it to the district office and field representative. When the permit is complete and approved, the DEQ sends a copy to the Army Core of Engineers. These application permits may include the projects of filling, dredging, and or building of a structure in wetlands, lakes and streams.

[xlv]Obtaining a wetland permit is very important process that allows the state to assess the potential impacts of losing a wetland. Since wetlands play such an important role the state must look at all of the possible occurrences that could happen to an area because of the destruction of a wetland. The state will look at things like increased flooding and how it impacts downstream properties. The state will look at the impact it has on groundwater and drinking wells. They will look at the impact on surface waters and on other streams, lakes, and aquifers. Finally, the state will look at the loss of critical wildlife and fisheries habitat. By looking at all of these aspects the state is trying to minimize the impact that the loss of a wetland will have. It is very important for all of these aspects to be considered because the impacts of the loss of a wetland could be very bad.

Unregulated wetlands are wetlands that are not regulated by the state, but the law allows local communities like townships and cities to regulate the wetlands that are not regulated by the state. Approximately, more than 90% of all wetlands in Michigan are regulated. Most are regulated by the state and then locals are able to regulate the smaller wetlands that remain, but this is unlikely because most choose not to regulate them. This creates a problem because officials are unaware of the possible ecological effects impacting unregulated wetlands. These wetlands could be filled, dredged, or drained, and these wetlands could be polluting groundwater if pollutants are collecting in wetlands. This is what could possibly happen to unregulated wetlands and why it is important to require a permit.

As environmentally concerned youth, our members share the knowledge of the United States strong dependence on industry. Wetlands, however, are being destroyed by the need for economic development. Many threatened and endangered species of plants, animals, and insects rely on wetlands. A wetland's individual qualities provide a nursery for many fish and plants that can only survive in particular conditions. Wetlands are important to inland lakes, fisheries, wildlife, ground water, and the Great Lakes as well as breeding grounds for many wild game animals. Wetlands work as a filtration system, breaking up contaminants and disposing clean

water into rivers and watersheds. Wetlands are being filled in and built on for economic development reasons. It is very important to preserve the wetlands that we have because once they are destroyed it is very difficult to replace using a process called mitigation. Mitigation in theory works as an artificial wetland. These wetlands can be very beneficial to the environment but it takes time for these wetlands to become as diverse and as prosperous as they once were. It is because wetlands are so fragile and important, that it is necessary to go through the permitting process for officials to make the best decisions possible.

Recommendations

After reviewing the facts, the Michigan 4-H Youth Conservation has created a list of recommendations we feel would improve the state management of wetlands. We recommend…

1. The State of Michigan continues to assumed control of the permitting process and not relinquishes this power back to the federal government. We also recommend that Michigan encourage the other Great Lakes states take over their own permitting processes so that the entire region is working on the same level.
2. Protection of smaller wetlands (ones less than five acres) receives more attention and possible protection at the state and local level.
3. Expand the reasons to require a permit for the conservation of wetlands beyond dredging and filling; removing minerals and dirt; operating machinery in the wetland; and removing water from the wetland.
4. Clarify what the landowner can and cannot do on the conservation easements.
5. That Michigan's wildlife, including threatened and endangered, as well as native species, is taken into consideration when forming new or revising old legislation concerning development and mitigation their wetland habitat. We suggest consideration of diverting money from mitigation to the development of reptile crossings.
6. That Michigan increase monitoring of mitigation progress by increasing DEQ resources. We also recommend that infractions in wetland mitigation be enforced swiftly and to the full extent of the law. Another recommendation would be to limit mitigation site selection to locations with better success rates, such as adjacent or historical wetlands. Finally, the ecological standards of mitigated wetlands need to be better defined and include criteria such as community structure, soil, hydrology, amphibian communities, and vegetation.
7. Support the protection of its natural wetlands through a stricter permit cycle and consider enforcing a tax to fund programs to protect natural wetlands.
8. To accomplish the goals of the Wetland Reserve Program, Michigan needs to attempt to recreate destroyed wetlands by removing unused buildings where natural wetlands once were and protect the remaining natural wetlands.
9. That the legislators consider a tax or fee to protect and conserve wetlands.

Conclusion

The Michigan 4-H Youth Conservation Council members have collectively created the list of recommendations from our research. We feel that it is most important for Michigan's governing body to support the protection of its natural wetlands through a stricter permitting process and consider creating a tax or fee program to fund the protection of natural wetlands. In order to accomplish the goals of the Wetland Reserve Program, Michigan should restore destroyed wetlands and protect those that remain. Wetland mitigation should be focused on locations with the greatest potential of high rate of success. Finally, the ecological standards of mitigated wetlands need to be better defined and include criteria such as community structure, soil, hydrology, wildlife communities, and vegetation. The Michigan 4-H Youth Conservation Council teens hope that you will consider our research and recommendations. Wetlands should be protected to save our water and our natural world. They provide shelter to many threatened and endangered species that depend on these particular habitats. Wetlands also filter out contaminants from water and reduce damages from flooding. Michigan has a large percentage of all the wetlands in the United States and needs to protect its natural resources. These functions and values of wetlands play a vital role in recreation, tourism, and the economy of Michigan.

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